

Abstract

Generating Syngas for NOx Regeneration Combined With
Fuel Cell Auxiliary Power Generation

During normal operation of a truck engine (12), a catalytic partial oxidizer (30) provides syngas (hydrogen and carbon monoxide) to regenerate NOx traps (35), for brief periods of time, or diverted (33) to the inlet (13) of an engine (12) via the EGR system (43-46).

5 Some hydrogen is extracted from syngas by a palladium membrane separator (63) and passed to the fuel inlet (52) of a fuel cell stack (51). The stack (51) provides auxiliary electric power to the truck. Humid air from the air outlet (55) of the stack is provided to a fuel/exhaust/air static mixer (25). A methanator (66) may convert
10 CO, leaked through the palladium membranes, into CH₄. Water/gas shift or steam reformer catalyst (76) at the inlet to or inside of the palladium membranes separator may provide some additional H₂.